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COMMITTEE ON THE PEACEFUL USES
OF OUTER SPACE

CO-ORDINATION OF OUTER SPACE ACTIVITIES WITHIN THE UNITED NATIONS SYSTEM: PROGRAMMES OF WORK FOR 1990 AND 1991 AND FUTURE YEARS

Report of the Secretary-General

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INTRODUCTORY NOTE

The present report has been prepared by the Secretary-General at the request of the Scientific and Technical Sub-Committee of the Committee on the Peaceful Uses of Outer Space and concerns efforts at co-ordinating the activities of organizations within the United Nations system that relate to assistance to developing countries in the practical application of space technology.*

The report is based on the contributions submitted by the organizations concerned in response to the United Nations request for information on concrete programmes of work envisaged primarily for 1990 and 1991 and was reviewed in its draft form at the Inter-Agency Meeting on Outer Space Activities, held at the headquarters of the International Telecommunication Union (ITU) from 27 to 29 September 1989.

The report consists of two sections: section I presents a summary of major activities and programmes planned for 1990 and 1991 and future years by the organizations within the United Nations system as a whole; section II presents concrete activities or programmes planned by individual organizations in an integrated form under substantive headings - remote sensing, communications, meteorology, basic space science, use of space technology for maritime communications and for air navigation and other activities in the field of space science and technology and its applications - rather than under organizations by which they are conducted. At the same time, in order to help the reader identify the activities of each organization in specific fields, a matrix of outer space programmes and a list of organizations participating in outer space activities are provided.

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* This is the fifteenth such annual report. The first 14 reports were contained in documents A/AC.105/166, 183, 201, 223, 242 and 278, A/CONF.101/BP.11/Add.1, A/AC.105/309 and Corr.1, A/AC.105/325, 342, 359, 373, 389 and 415.

LIST OF ORGANIZATIONS PARTICIPATING IN OUTER SPACE ACTIVITIES

A. United Nations

Outer Space Affairs Division

Remote sensing - paragraphs 13 (a)-(d), (j), (l), (n), 26 (a)-(d), 29, 61 (

Communications - paragraphs 75, 76, 79 (a)-(c), 82

Meteorology - paragraphs 103, 106, 107

Basic space science - paragraphs 130-132

Other activities in the field of space science and technology and its applications - paragraphs 140, 141, 143, 144

Natural Resources and Energy Division of the Department of Technical Co-operatio for Development (DTCD)

Remote sensing - paragraphs 34, 36

Centre for Science and Technology for Development

Other activities in the field of space science and technology and its applications - paragraph 143

Economic Commission for Africa (ECA)

Remote sensing - paragraphs 18-24, 29 (b), 30, 35, 51, 61 (a)-(h), 64, 71

Communications - paragraphs 81, 87, 88, 92

Meteorology - paragraphs 101, 104, 109, 110, 123

Economic and Social Commission for Asia and the Pacific (ESCAP)

Remote sensing - paragraphs 13 (f), 26 (e), (f), 34, 37-39, 62, 63

Communications - paragraph 76

Economic and Social Commission for Western Asia (ESCWA)

Remote sensing - paragraphs 17, 57-60

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United Nations Environment Programme (UNEP)

Remote sensing - paragraphs 16, 40-43, 45, 61 (d), 65, 66, 74

Communications - paragraph 85

Meteorology - paragraphs 101, 109, 117, 127, 128

Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space

Communications - paragraph 93

Other activities in the field of space science and technology and its applications - paragraph 142

B. Specialized agencies

Food and Agriculture Organization of the United Nations (FAO)

Remote sensing - paragraphs 13 (a), (c), (e)-(m), 14, 15, 25, 27 (e), 28, 31, 32, 41, 44-48, 54-56, 61 (c), 67-69, 73

Communications - paragraphs 78, 85

Meteorology - paragraphs 101, 110

United Nations Educational, Scientific and Cultural Organization (UNESCO)

Remote sensing - paragraphs 13 (o), 27 (a)-(e), 33, 49, 50, 72

Communications - paragraphs 76, 84 (a)-(e), 98

Meteorology - paragraphs 109, 126

International Civil Aviation Organization (ICAO)

Communications - paragraph 97

Use of space technology for land, maritime and aeronautical mobile services - paragraph 139

World Health Organization (WHO)

Remote sensing - paragraphs 25, 52, 53

Communications - paragraphs 77, 86, 91

Use of space technology for land, maritime and aeronautical mobile services - paragraph 135

International Telecommunication Union (ITU)

Remote sensing - paragraphs 61 (1), 70

Communications - paragraphs 80 (a)-(e), 83, 89 (a)-(h), 90, 94-96

Meteorology - paragraphs 105, 109

Use of space technology for land, maritime and aeronautical mobile services paragraphs 134, 138

World Meteorological Organization (WMO)

Remote sensing - paragraphs 13 (c), (e), (i), (l), 72

Meteorology - paragraphs 99, 100-102, 108-122, 124, 125, 127

Use of space technology for land, maritime and aeronautical mobile services paragraph 134

International Maritime Organization (IMO)

Use of space technology for land, maritime and aeronautical mobile services paragraphs 133, 134, 136, 137

World Intellectual Property Organization (WIPO)

Communications - paragraphs 84 (e), 98

MATRIX OF OUTER SPACE PROGRAMMES*

	A			B				C			D	E	F
	1	2	3	1	2	3	4	1	2	3			
OSAD	13(a)-(d), (j), (l), (n), 26(a)-(d)	29, 61(h)		75, 76, 79(a)-(c)	82			103	106, 107		130-132		140, 141, 143, 144
NRED/TCD		34, 36											143
CSTD													
ECA	18-24, 29(b)	30, 35, 51, 61(a)-(h)	64, 71		81, 87, 88	92		101, 104	109, 110	123			
ESCAP	13(f), 26(e), (j)	34, 37-39	62, 63	76									
ESCWA	17	57-60											
UNEP	16	40-43, 45, 61(d)	65, 66, 74		85			101	109, 117, 127, 128				142
OLA							73						
FAO	13(a), (c), (e)-(m), 14, 15, 25, 27(c), 28	31, 32, 41, 44-48, 54-56, 61(c)	67-69, 73	78, 85				101	110				
UNESCO	13(o), 27(a)-(e)	33, 49, 50	72	76, 84(a), (e), 98					109	126			
ICAO							97					137	
WHO	25	52, 53		77	86	91						135	
ITU		61(1)	70		80(a)-(e), 83	89(a)-(h), 90	94-96					134-138	
WMO	13(c), (e), (i), (l)		72					99, 100-102	108-122, 124, 125, 127			134	
IMO												133, 134, 136, 137	
WIPO						84(e)		98					

* The capital letters and Arabic numerals in the column headings refer to the sections and subsections of section II of the present report. The numbers in each column designate the relevant paragraphs.

Section I

SUMMARY OF MAJOR ACTIVITIES AND PROGRAMMES PLANNED FOR 1990 AND 1991 AND FUTURE YEARS

1. The organizations within the United Nations system have planned activities for 1990 and 1991 and future years within the categories of remote sensing, communications and meteorology. Organizations within the United Nations system will also conduct valuable outer space-related or -aided activities in basic space sciences and in land, maritime and aeronautical communications and other activities related to space science and technology and its applications. The planned activities generally range from education and training programmes through fellowships, training workshops and summer schools, to expert services and survey missions to identify specific areas of applications relevant to a given country or group of countries and to carry out relevant studies or pilot projects as well as to disseminate information on the status of technology. In addition, there are other ongoing activities relating to the regulation and utilization of space activities.

2. In the area of remote sensing, the United Nations and specialized agencies have planned a number of international, regional and national training courses. They cover remote sensing applications in general as well as specialized topics such as the use of high-resolution satellite imagery in agricultural, fisheries and forestry applications, the use of low-resolution imagery from environmental satellites for early warning on crop monitoring on desert locust control in Africa, the ARTEMIS system of the use of infra-red and radar systems in assessing and managing natural resources and the monitoring of information through the Global Resource Information Data base (GRID) within the Global Environmental Monitoring System (GEMS) and Geographical Information Systems (GIS) to develop surveying and mapping systems. Most of these international and regional training courses are jointly organized by two to four organizations within the United Nations system, often in co-operation with other international organizations and/or Governments. National courses on remote sensing applications are also planned in a number of developing countries. Fellowships in the area of remote sensing will also be offered in the 1990-1991 period by a number of international organizations and Member States.

3. Many of the organizations of the United Nations will offer expert services in their respective areas of competence. A number of pilot projects relying on remote sensing applications in areas such as vegetation monitoring, natural disaster forecasting and assessment of their impact on food security, geological mapping and mineral exploration, land use and natural hazards monitoring are being planned. In the area of dissemination of information on remote sensing technology, organizations either provide information upon request or issue newsletters and technical publications on regional or sectoral development of remote sensing capabilities.

4. Regarding communications, a number of training courses, workshops and seminars are planned in such areas as applications of satellite technology to rural communication and use of communications systems to support primary health care, as well as search and rescue missions and disaster relief operations. Fellowships in the field of communications are also offered through the United Nations system with the co-operation of the Member States agencies.

5. Various expert and technical advisory services are offered in the planning of global and regional satellite communications systems as well as Earth station projects and satellite communications, navigation and surveillance for international civil aviation. In addition, the legal and regulatory aspects of the frequency spectrum for space communications will be considered. Furthermore, the organs concerned will disseminate information on services and studies and hold conferences to inform the Member States thereon.

6. A series of workshops and seminars are planned for 1990 and 1991 on various aspects of satellite meteorology and its applications. A number of technical co-operation activities in meteorology and operational hydrology are planned in Member States. In addition, activities on the use of space technology in the evaluation and management of marine resources, particularly on the Atlantic coast of Africa and Indian Ocean region, are being developed.

7. The World Weather Watch (WWW) increasingly uses satellite technology not only for obtaining meteorological information through remote sensing techniques but also for communications. Particularly useful is the use of such techniques in the tropical cyclone programme. Under the world climate programme, various climate monitoring activities will be undertaken involving the use of satellite data. A series of technical reports and publications on activities such as ozone depletion will be made available.

8. In basic space sciences, the United Nations has planned a workshop to benefit ESCAP member States. Also, a series of fellowships in space research, with a duration from one to three years, will be offered. The United Nations, through its Programme on Space Applications, will continue to collaborate with the Committee on Space Research to support scientists from developing countries in space research.

9. The work of the specialized agencies of the United Nations is also making significant contributions in new areas of applications of space technology. In maritime communications, the use of second-generation International Maritime Satellite Organization (INMARSAT) satellites should be available around 1990 and further progress is being made towards the development of the future global maritime distress and safety system (GMDSS), aiming at its orderly introduction in stages beginning in the early 1990s. Another example is the application of satellites for the early identification of areas of agricultural drought and desert locust infestation.

10. In the use of mobile satellite services in air navigation, further progress is being made towards establishing air-ground data links for use by air traffic services.

11. The organizations within the United Nations system are also actively involved in promoting education and the development of skills at the local level in the field of space science and technology and its applications. Directories on various aspects of space science and technology will continue to be issued.

12. The United Nations Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space will continue to elaborate draft principles related to nuclear power sources and to consider legal aspects of the sharing of the benefits of the exploration and utilization of outer space, taking into account the needs of developing countries.

Section II

ACTIVITIES PLANNED BY THE ORGANIZATIONS WITHIN THE UNITED NATIONS SYSTEM FOR 1990 AND 1991 AND FUTURE YEARS

A. REMOTE SENSING

1. Education and training programmes through training courses, workshops, seminars and fellowships

Training courses/workshops/seminars

13. The following training courses/workshops/seminars are being planned by the organizations within the United Nations system in 1990 and 1991:

(a) Fifteenth United Nations/FAO International Training Course on Remote Sensing Applications in co-operation with the Government of Italy, Rome, 7-25 May 1990;

(b) United Nations/European Space Agency (ESA) Workshop on Microwave Remote Sensing Technology, in co-operation with the Government of Brazil, São José dos Campos, Brazil, September 1990;

(c) Sixth United Nations/FAO/WMO/ESA Remote Sensing Training Course, 1990;

(d) United Nations Training Course on Remote Sensing Education for Educators, in co-operation with the Government of Sweden, Stockholm/Kiruna, 14 May-15 June 1990;

(e) Eleventh FAO/United Nations Disaster Relief Organization (UNDRO)/WMO/ESA International Training Course: Remote sensing applications to agricultural drought and desertification, Rome, 1990;

(f) FAO/ESCAP/ESA/International Institute for Aerial Survey and Earth Sciences (ITC), regional training course: Remote sensing - a new information technology for decision makers, Kuala Lumpur, 1990;

(g) FAO/ESCAP Regional Remote Sensing Training Course on Forestry Applications in co-operation with the Federal Republic of Germany, Bangkok, 1990;

(h) FAO/ITC Course on Environmental Satellites, Remote Sensing Applications for Food Security and Locust Control in Arid and Semi-arid Regions, Enschede, Netherlands, June to September 1990;

(i) Twelfth FAO/UNDRO/WMO/ESA International Training Course on Remote Sensing Applications to agricultural drought and desertification (in French), Rome, 1991;

(j) Sixteenth United Nations/FAO International Training Course on Remote Sensing Applications, in co-operation with the Government of Italy, Rome, 1991;

(k) FAO/ESA/ITC, regional training course: Remote Sensing - A New Information Technology for Decision Makers, Eastern and Southern Africa, 1991;

(l) Seventh United Nations/FAO/WMO/ESA regional remote sensing training course, 1991;

(m) FAO regional training course on remote sensing applications, in co-operation with the Federal Republic of Germany, 1991;

(n) United Nations training courses on remote sensing applications for the benefit of small States in the South Pacific and in the Caribbean, 1991;

(o) The UNESCO Intergovernmental Oceanographic Commission plans to organize a workshop on satellite-derived sea surface temperature data and a training course on the use of remote sensing in oceanographic applications, 1990-1991;

(p) The ESCAP Regional Remote Sensing Programme (RRSP), through a regional network for education and training on remote sensing, will organize six short-term training courses, four in 1990 and two in 1991, on specialized topics in six selected centres of excellence in the network;

(q) RRSP plans to organize two multidisciplinary remote sensing symposia in 1990 and one in 1991 with the remote sensing centres/programmes offering host facilities in the region;

(r) RRSP plans to organize the 1990 and 1991 annual meetings of the Directors of Remote Sensing Centres in the ESCAP region for the exchange of information and mutual interaction, in conjunction with the annual meeting of the Intergovernmental Consultative Committee (ICC) on RRSP;

(s) RRSP plans to organize two technical working group meetings in 1990 and one in 1991 on topics of common concern that ICC will decide on at its annual session in 1990;

(t) RRSP plans to organize two seminars in 1990 and one activity in 1991 in conjunction with the annual Asian Conference on Remote Sensing to provide support to this important regional non-governmental organization (NGO) activity in remote sensing.

14. The Italian Trust Fund project for FAO remote sensing training activities is expected to be extended for three years (1990-1992). Each year two interregional courses, one or two regional or subregional courses and three to four national courses are planned, some of them in co-operation with the United Nations and specialized agencies. Pilot projects will follow some of these courses to provide additional practical training. FAO also plans to

continue remote sensing training courses in co-operation with the Federal Republic of Germany.

15. In 1990, FAO plans to start two new series of training courses: (a) one series of training courses that will be conducted jointly with ESCAP, ESA, and ITC will have regional remote sensing training courses for managers and planners, with the first training course being held in Malaysia in February 1990; (b) the second series will be conducted jointly with the Government of Czechoslovakia and will include international remote sensing training courses for agricultural applications, with the first course planned to be conducted in Czechoslovakia, summer of 1990.

16. UNEP has implemented GRID as the principal data management programme within GEMS. GRID designed as a distributed data base offers access to additional GEMS specialized data bases. Many of the data planes used in the geographic information system (GIS) are based on information derived from space-borne sensors. At present there are three fully operational GRID centres: GRID-Nairobi at UNEP headquarters, GRID-Geneva and GRID-Bangkok. Co-operating laboratories include those of the United States National Aeronautics and Space Administration (NASA), such as the Earth Resources Laboratory at the Stennis Space Center and the Goddard Space Flight Center, together with the United States Geological Survey Earth Resources Observation Systems (EROS) Data Center. There is an ongoing six-month Swiss-sponsored GIS training course administered by the United Nations Institute for Training and Research (UNITAR) under which fellowships are provided to participants from developing countries. Curricula are also being developed with the Asian Institute of Technology (Thailand) and the Regional Centre for Services in Surveying, Mapping and Remote Sensing (Kenya) to provide training in remote sensing and geographic information systems technology for participants in the GRID programme from South-East Asia and Africa, respectively.

17. ESCWA has included in its work programme for 1990-1991 a programme element entitled "Promotion of regional co-operation in the application of remote sensing" which will be implemented through the Netherlands Trust Fund in co-operation with the United Nations Programme on Space Applications, with the goal of updating the technical knowledge of those who deal with remote sensing in the region by utilizing the training facilities created by the United Nations Programme on Space Applications.

18. Under the auspices of ECA, the Regional Remote Sensing Centre (CRTO) in Ouagadougou plans to organize two regular remote sensing courses, each of nine months' duration, for graduates in natural resources, earth sciences and environmental studies, in October of 1990 and 1991. Courses will be offered in English and French for 70 specialists.

19. CRTO will offer introductory remote sensing courses (one in 1990 and another in 1991) of two weeks' duration to approximately 200 nationals of the States members of the Centre. Also, two refresher courses (one in English and one in French) of two months' duration will be organized for about 40 participants who are former trainees of the Centre.

20. CRTO plans to offer two specialized courses, one in rangeland management (for anglophone participants) in April 1990 and the other on census cartography (for francophone participants) in April 1991.

21. CRTO will be organizing three seminars of one to two weeks' duration on agricultural data collection (one in Burkina Faso in July and another in the Congo in November 1990) for natural resource managers, decision makers and users and one on human settlements in an anglophone country in 1991.

22. ECA plans to organize in early 1990 the annual meeting of the chief executives and the directors of training of its sponsored regional remote sensing centres to review existing syllabuses and prepare new ones for 1990 and 1991. The meeting will undertake a general assessment of the training programmes with a view to preparing comprehensive programmes in remote sensing education that will meet African needs in the decade 1990-2000.

23. ECA, in collaboration with the African Organization for Cartography and Remote Sensing (AOCRS) and the regional centres, will continue to promote regional co-operation in the application of remote sensing and to assist member States with the training of their nationals for the development of their natural resources.

24. During 1990-1992 ECA and its Regional Centre for Training in Aerospace Surveys (RECTAS) will continue to offer diploma (training) courses in remote sensing at the technician, technologist and post-graduate level with a duration of 9, 12 and 12 months respectively (see A/AC.105/415, para. 19).

25. The WHO Division of Vector Biology and Control and the FAO Remote Sensing Centre continue to investigate the possibility of organizing a training course on the use of remote sensing in monitoring water resource development projects which could create habitats favourable to disease vectors.

Fellowships

26. The United Nations Programme on Space Applications, together with a number of Governments and international organizations, provide long-range fellowships for candidates from developing countries to undertake in-depth training as follows:

(a) The Government of the Union of Soviet Socialist Republics intends to initiate a new fellowship programme placing emphasis on remote sensing technology applications in the developing countries. The fellowship programme, which initially will benefit 20 to 25 participants, will provide research opportunities in (i) development of new data analysis techniques, (ii) development of new instruments for remote sensing and (iii) development of space manufacturing (manufacturing of materials in space). The programme is a joint venture of GLAVKOSMOS, the State Committee on Public Education, Lumumba University and other research centres in the USSR. The fellowship programme will be tenable at the Centre for Research and Studies for Foreign

Specialists. Up to 50 per cent of the participants will be selected on the basis of bilateral arrangements between the USSR and other Governments that might be interested; the other 50 per cent will be participants invited under the auspices of the United Nations Space Applications Programme;

(b) The Brazilian Government will renew 10 fellowships for participants from Latin America and the Caribbean for training in remote sensing in 1990;

(c) The German Democratic Republic Government is offering a one-year fellowship in 1990 in remote sensing applications to geological sciences, tenable at the Central Institute for Physics of the Earth of the Academy of Sciences of the German Democratic Republic, Potsdam;

(d) ESA has renewed its offer of a one-year fellowship on remote sensing information systems tenable at the European Space Research Institute (ESRIN), Frascati, Italy, in 1990;

(e) ESCAP-RRSP plans to offer up to 17 short-term fellowships for each of the courses in 1990 and 1991; the host countries will bear the expenses of five national participants in each course. It plans to offer eight travel grants in 1990 and four for 1991 for higher studies which will be awarded in conjunction with fellowships at the graduate level in the region;

(f) ESCAP-RRSP plans to support the participation of one expert from each member State in the three multidisciplinary meetings for 1990 and 1991. In addition, RRSP will support the participation of any contributing experts from developing countries. RRSP will support about 20 participants at each meeting. RRSP also plans to support one participant, with a total up to 20, from each country at the Meeting of the Directors of Remote Sensing Centres in 1990 and 1991. There will be up to 12 participants in each working group meeting for each year 1990 and 1991.

27. UNESCO will support in the next few years the following post-graduate training courses dealing with the applications of remote sensing to integrated natural resources research, management and development:

(a) International post-graduate training course in survey integration for development at ITC, Enschede, Netherlands;

(b) Post-graduate course in integrated study and rational use of natural resources at the universities of Paris, Montpellier and Toulouse, France;

(c) International post-graduate training courses on remote sensing applications and digital image processing at ITC, Enschede, Netherlands;

(d) International post-graduate training course on photo-interpretation applied to civil engineering and to geology, at the Instituto Geográfica Agustín Codazzi (IGAC), Bogotá;

(e) UNESCO co-operates with FAO in organizing post-graduate training in the use of remote sensing images in water resources studies.

28. FAO, through its planned Italian Trust Fund Project for Remote Sensing Training, will provide two half-year fellowships annually in 1990-1992 for training in the agricultural applications of remote sensing.

2. Expert services and survey missions to identify specific areas of applications relevant to a given country or group of countries and to carry out specific studies on pilot projects

Provision of expert services

29. Plans are in progress to implement the recommendations of the United Nations Meeting of Experts on the Development of Remote Sensing Skills and Knowledge held in 1989 at Dundee, United Kingdom of Great Britain and Northern Ireland; following that meeting consultations are being held with a number of Governments and institutions as well as with UNDP:

(a) To develop indigenous capability in remote sensing in the developing countries;

(b) To implement the proposal for establishing a remote sensing information programme in the ECA region; follow-up activities will depend on the outcome of a review exercise by UNDP of all UNDP-funded remote sensing projects in Africa.

30. ECA and the Regional Centre for Services in Surveying, Mapping and Remote Sensing (RCSSMRS) will continue to offer training courses co-sponsored by various donors including the United Nations, its specialized agencies and the United States Agency for International Development (USAID). Courses, conducted in English or French, last for three to four weeks (see A/AC.105/415, para. 26).

31. At present, the FAO Remote Sensing Centre provides technical support to some 60 projects annually. FAO will gradually increase provision of advisory and information services on remote sensing applications to forestry, rangelands, fisheries and on related institutional infrastructures, in response to increasing requests for assistance from member States. It is expected that this trend will accelerate when image data from the European Earth Resources Satellite ERS-1 becomes available at the end of 1990.

32. FAO will continue to assist its regional offices, United Nations regional economic commissions and regional remote sensing centres in the efficient use of appropriate remote sensing technology for the mapping, assessment and monitoring of renewable natural resources and natural disasters.

33. UNESCO and UNDP assist the National Water Resources Institute at Kaduna, Nigeria, in building up a remote sensing analysis facility for water resources development and management studies.

34. The ESCAP-RRSP staff, on an as-needed basis, will provide general remote sensing consultation to member countries' programmes during 1990-1991. When the RRSP staff members cannot fulfil or quickly respond to consultation requests themselves, RPSP will serve as co-ordinating office in providing consultants from a member State to other member States. For such consultants, RRSP will provide communication or travel support but no consulting fees. If needed RRSP will also arrange for consultants from FAO, DTCD or agencies outside the United Nations system.

35. ECA, AOCRS and the regional centres will continue in 1990-1991 to provide technical advisory services on remote sensing applications to the member States to facilitate the Lagos Plan of Action, Africa's Priority Programme for Economic Recovery (APPER), the United Nations Programme of Action for African Economic Recovery and Development (UN-PAAED) and the African Alternative Framework to Structural Adjustment Programmes for Socio-Economic Recovery and Transformation (AAF-SAP).

Study and pilot projects

36. The Natural Resources and Energy Division (NRED) of DTCD of the United Nations will continue to include and use new methodologies for resources exploration and studies related to the application of sophisticated digital image processing in response to requests from the Committee on Natural Resources. Also, in response to requests from United Nations Member States, DTCD will continue to serve and assist in the design, execution and financing of remote sensing projects that have training, consultancy and delivery of equipment as major components.

37. ESCAP-RRSP will continue to implement 10 pilot projects on regional or subregional problems or on the development of regionally transferable methodologies. Also, it will identify three new pilot projects for 1990-1991. It will limit support to costs for data, for materials and for disseminating pertinent results. Scientists from at least two countries will conduct pilot projects.

38. Within the overall framework of RRSP, ESCAP's Agriculture Division is executing a satellite crop monitoring project with financial support from UNDP and USAID. The programme's purpose is to develop expertise using United States National Oceanic and Atmospheric Administration (NOAA) satellite images along with existing rainfall-based drought early warning systems to enhance the ability of Governments to estimate drought-induced food shortages on a timely basis. A seminar will be organized to disseminate study results in 1990.

39. ESCAP-RRSP will continue to implement the South-Pacific subprogramme in 1990 through the University of the South Pacific at Suva, Fiji. Under this subprogramme, subregional training and pilot projects will be organized for the island countries of the South-Pacific subregion of ESCAP. Two national training courses and one multidisciplinary meeting will be organized in 1990.

40. UNEP continues to make active use of remote sensing technology within the framework of GEMS for the monitoring and assessment of natural resources. National scale (usually site-specific) demonstration case studies are being carried out through GRID to demonstrate the utility of applying geographical information systems technology to resource management and land-use planning and to provide on-the-job training for national and agency participants. Current programme activities utilizing satellite data include Socotra Island, Democratic Yemen (building of a resource data base), Costa Rica (construction of country-wide environment and natural resource data base) and Western Samoa (construction of country-wide natural resource data base) (see A/AC.105/415, para. 34).

41. The ad hoc group of experts from, inter alia, UNEP, FAO and the European Community Joint Research Centre (ISPRA), together with NASA's Goddard Space Flight Center, are continuing work to develop methods to maximize the use of remote sensing in the mapping of forests on a global scale. Following the pioneering work of the Goddard Space Flight Center, one-kilometre-resolution multi-spectral data from the NOAA advanced very high resolution radiometer (AVHRR) sensor is being tested in both western Africa and the Amazon basin to determine their usefulness in developing a first-level forest/non-forest classification. If successful, the method will be applied on a global scale to support the FAO global project entitled "Tropical forest resources assessment 1990".

42. UNEP, in co-operation with the International Soil Reference and Information Centre (ISRIC), the International Soil Science Society (ISSS), ITC and the Dutch Soil Survey Institute (Stiboka) is carrying out a global assessment of soil degradation (GLASOD), which will be completed in 1990. In addition, the same organizations are carrying out the first phase of the development of a world soils and terrain digital data base (SOTER) through a test site located in Latin America. Other pilot studies envisaged for SOTER over the 1990-1991 period are in West Africa, East Africa, the Mesopotamian plain, the Indo-Ganges plain and Sumatra-Malaysia. Satellite remote sensing products are being used to generate some of the data for both GLASOD and SOTER. Both of these are GEMS activities as well as part of the UNEP soils unit programme. Other relevant activities of the soils unit, executed jointly with FAO, include the use of satellite data on agro-climate, land cover and soils/terrain together with conventional data in formulating national soils policies for Syria and Uganda. The thematic mapper (TM) will be used to compile natural resources data sets in the Zambezi River.

43. UNEP, through the GEMS programme, is using remotely sensed data in the field of desertification control. Activities include the preparation of a

global desertification assessment map (1:10,000,000) to be completed in 1992 and the development of an associated geographical information system. Other relevant projects which are based on remotely sensed materials are: (a) Desertification Assessment and Mapping National Pilot Study (Kenya) which utilizes experimental earth observation satellite (SPOT) data to set vegetation and soils unit boundaries; (b) support to West African countries in strengthening national desertification control activities through research and training; (c) development of methods for assessment and mapping of desertification in the south Saharan arid, semi-arid and sub-humid ecozones where SPOT data are used for comparison with earlier aerial photographs of two different dates. In the second phase, the desertification project will use 1991 satellite images to interpolate between the original study, this should greatly increase the image of the mapped areas. Consideration is also being given to making UNEP's desertification data base holdings directly accessible to developing country users through advanced telecommunication systems.

44. FAO will continue its development of integrated remote sensing and agro-meteorological inputs into the FAO Global Information and Early Warning System on Food Security (GIEWS), assisted by the FAO Remote Sensing and Meteorological Data Users Committee and supported by the Governments of Japan and the Netherlands.

45. FAO, in co-operation with UNEP through GEMS-GRID, will participate in the ESA project for the development and testing of a satellite communications system for real-time transmission of remote sensing and other data to users in Africa (DIANA). DIANA will permit two-way communications, using the International Telecommunications Satellite Organization (INTELSAT) satellites between FAO headquarters and remote terminals at regional and national levels. DIANA is scheduled to become available for demonstration in late 1990.

46. FAO will participate in the development and testing of operational methodology for the integration of remote sensing data with data from ground surveys and existing maps in GIS and for the efficient utilization of such an integrated data base. FAO will also follow closely developments in research applied to pattern recognition, expert systems relevant to agriculture, forestry and fisheries applications.

47. FAO and ESA will continue their co-operation in developing appropriate techniques for the application of satellite synthetic aperture radar (SAR) imagery to agriculture and forestry applications in developing countries. This co-operation, which includes the provision of training courses, is part of the preparations for the forthcoming launch of ERS-1, Radarsat and other earth resources satellites with SAR included in their sensors payload.

48. FAO, through its French Trust Fund remote sensing project, continues the implementation of pilot projects on the application of high-resolution SPOT imagery in the agriculture, forestry and fisheries sectors in developing countries.

49. UNESCO and ITC (Netherlands) initiated a co-operative programme entitled "Geo-information for environmentally sound management of natural resources". The programme will include integrated remote sensing research and training activities in the fields of ecology, hydrology and geology. In addition, seminars for high-level decision makers in these fields will be organized.

50. UNESCO will contribute to the International Council of Scientific Unions (ICSU)/International Geosphere Biosphere Program (IGBP) project by organizing remote sensing research related to the study of global changes in the geo-biosphere.

51. RECTAS plans to carry out land-use mapping in the Volta basin in 1990 using remote sensing data (see A/AC.105/415, para. 47).

52. The WHO Division of Vector Biology and Control and Malaria ACTION Programme of WHO with NASA will continue, and is planning pilot projects to identify remote sensing applications for the planning and monitoring of vector control operations, particularly environmental management.

53. WHO's Emergency Preparedness and Response Unit within the Division for External Co-ordination, in co-operation with one of WHO's collaborating centres, is developing a system for the utilization of existing data bases, known as the Consolidated Information System for Famine Management in Africa (CISFAM). The system will be used for the purpose of improving the management of the famine situation in Africa.

54. FAO will use data from the ARTEMIS system to update and improve estimates of the length of the growing period, particularly in the Sahel region, in order to ascertain any changes in population supporting capacity owing to climate fluctuations or changes.

55. The Fisheries Department of FAO will include remote sensing in the forthcoming workshops on GIS applications in aquaculture, with two workshops in Africa in 1990 and one in the Middle East in 1991. Remote sensing will be an activity of the forthcoming Lake Tanganyika fishery resources project (GCP/RAF/227/FIN) and, more broadly, the ARTEMIS second phase will include an inland fisheries component. Remote sensing will be increasingly used for fishery and aquaculture field projects in 1990-1991 and future years.

56. FAO's Forestry Department will continue providing technical assistance to member States in the assessment of existing forest resources and trends in deforestation, forest degradation and plantations. The first assessment of global deforestation will be completed by the end of 1990. Field projects leading to assessment at national, regional and global levels are assisted by collaboration with national and international institutes and agencies in the dissemination of new technologies and know-how. In this latter field, activities in 1990-1991 will focus on the dissemination of information and transfer of know-how related to image data from SPOT, Landsat-TM and NOAA/AVHRR and their integration in geographic information systems.

57. ESCWA has initiated projects to assist member States in solving problems related to the utilization of remote sensing technology. The first, entitled "Assessment of water resources by using remote sensing techniques in the ESCWA region", is designed to develop, utilize and manage water resources. It is divided into two phases. The first phase, which is being implemented to optimize the use of ground water basins, covers the ground water basin that Saudi Arabia and Jordan share and a basin shared by Democratic Yemen and Yemen. The second phase of the project has as its aim the development of a comprehensive hydro-geological map covering the whole ESCWA region. The Islamic Development Bank has already committed financial support for this phase.

58. ESCWA plans to implement a project entitled "Control of mobile sand and protection techniques", designed to extend the scientific research that some national research centres are conducting to cover adjacent ESCWA countries, namely Egypt, Iraq, Jordan, Kuwait and the Syrian Arab Republic. Using remote sensing, the project aims at solving the very serious problems of movement of sand sheet and its damaging effects.

59. ESCWA has formulated a project entitled "Development of indigenous capability in remote sensing technology through the provision of relevant education for the educators", the first comprehensive project to deal with the deficiency in the education system in the area of remote sensing teaching and training. A comprehensive project proposal has already been formulated with the assistance of the United Nations Space Applications Programme. Its implementation will include an extensive expert group meeting involving policy makers, educationists and experts in remote sensing to study the project proposal that has been formulated prior to presenting it to the UNDP Regional Bureau of Arab States and Europe for execution.

60. ESCWA has initiated a project entitled "Regional remote sensing programme" that will set up a network of an effective institutional and technological information system in the region to strengthen the national capabilities in acquiring processing and utilizing remote sensing data on natural resources and environment.

61. During the period 1990-1991, RCSSMRS will be executing the following projects:

(a) Food crop estimation for Sudan, part of the second phase of the Sudan Emergency and Recovery Information and Surveillance System (SERISS) using remote sensing techniques for crop assessment and forecasting, especially in the traditional agricultural areas. Funding is provided by USAID;

(b) Forest resources inventory and mapping project in the central and western regions of the Sudan. Image maps developed from LANDSAT TM and SPOT data will provide up-to-date map information for the two regions. Training of Sudanese personnel will also be involved. USAID is funding the project;

(c) FAO will execute a project that will include three workshops, funded by the Japanese Trust Fund, to provide remote sensing inputs on food security, early warning systems and desert locust control for the Inter-Governmental Association on Drought and Development (IGADD) in collaboration with, ECA, the Southern Africa Drought and Development Community (SADDC) and Comité Inter-Etat Pour la Lutte Contre la Sécheresse dans le Sahel (CILSS) countries respectively, in collaboration with ECA. With efficient use of ARTEMIS, an advanced system for the acquisition and analysis of data from environmental satellites, analog and digital image products will be integrated with agro-meteorological data. METEOSAT receiving stations will be constructed in Harare (Meteorological Department) and in Nairobi (RCSSMRS premises). Information on total estimated rainfall and vegetation conditions in the IGADD and SADDC countries will be produced at 10-day and monthly intervals;

(d) Natural resources data analysis and management by GIS in collaboration with UNEP and UNITAR. The micro-computer based GIS installed in RCSSMRS will be used to train nationals of member countries in the management of natural resources data. This is a pilot project with provision for demonstration projects which will last until 1992. UNDP is funding the project with the World Bank as the executing agency;

(e) Vegetation and forest cover mapping in Tanzania in collaboration with the Department of Forest and Bee-keeping, to provide maps to a scale of 1:250,000 using satellite data to accelerate the process of updating existing maps;

(f) Land-use mapping of the Arusha region in Tanzania to facilitate the mapping of natural resources for future planning and development;

(g) Locust inventory in Africa with the Technical University of Berlin and Reading University, to implement a project on the inventory of locust habitats in Africa using remote sensing techniques. The European Community is funding the project, with a life span of three to four years;

(h) Indian Ocean Marine Affairs Cooperation (IOMAC) Programme in collaboration with the United Nations Outer Space Affairs Division to undertake a small-scale feasibility study of satellite remote sensing applications for mapping, monitoring, developing and managing marine resources. In future years, the project will be expanded and extended to benefit member States of the subregion;

(i) International Radio Consultative Committee (CCIR) Study Group 2 of ITU will continue its studies relating to remote sensing systems. The final meeting of the group (September 1989) summarized the results of studies during the period 1986-1990 and will present its findings to the seventeenth CCIR Plenary Assembly in 1990.

3. Dissemination of information on the status of technology

Continuing activities

62. ESCAP-RRSP will continue to operate the Regional Information Service (RIS) which aims through voluntary co-operation and active participation of the ESCAP member countries to promote exchange of experience and knowledge of remote sensing. Seventeen countries have nominated the RIS contact points for RRSP and these contact points will act as the RIS national correspondents.

63. The ESCAP-RRSP publication programme will continue to provide the Remote Sensing Newsletter, published quarterly in January, April, July and October. A regional remote sensing journal, the Asian-Pacific Remote Sensing Journal, will also be published in January and July. A directory of remote sensing centres in the region will be published in 1990. The proceedings and reports of various meetings and pilot projects will be published regularly at the completion of the activities.

64. ECA and the United Nations Outer Space Affairs Division, in collaboration with the ECA-sponsored regional centres at Ile-Ife, Nairobi, and Ouagadougou and the Pan African Documentation Information System (PADIS), will implement the programme on a remote sensing information system for Africa (1990-1991) with UNDP funding for the fourth cycle programme for Africa (see para. 29 (b)).

65. UNEP, through the International Referral System for Courses of Environmental Information (INFOTERRA), has over 200 registered sources that provide information on remote sensing and satellite imagery technology and their use in environmental data collection in the fields of mapping and surveying, atmosphere and climate, land and aquatic resources, and pollution monitoring and assessment. It is expected that further sources will be registered in the 1990-1991 period.

66. UNEP, through the Monitoring and Assessment Research Centre (MARC), London, produces a biennial compendium of environmentally related data as part of GEMS. MARC, acting as compiler of these data, has an interest in the application of satellite remote sensing to environmental monitoring. The use of satellite data to monitor changes in land use, atmospheric chemistry (total ozone), meteorological variables (cloud cover, precipitation) and hydrological parameters (snow cover, sea-ice extent) are currently of particular interest. The data are published in the Environmental Data Report.

67. FAO will continue to publish review reports on agriculture, fisheries and forestry applications of remote sensing and GIS in 1990-1991 and future years.

68. FAO plans to convene three expert consultations in the period 1990-1991, namely, (a) on agricultural applications of satellite remote sensing; (b) on agricultural drought forecasting based on agro-meteorological and remote sensing data; (c) on application of high-resolution satellite data for forest inventory and mapping. These expert consultations will be held at FAO headquarters.

69. FAO plans to strengthen further its role as the clearing-house for information on the agricultural, forestry and fisheries applications of remote sensing. In 1990 its Remote Sensing Centre will start publishing a quarterly FAO Remote Sensing Newsletter.

70. ITU will publish in the period 1990-1992 CCIR volume II, containing the texts concerning remote sensing systems as approved by the seventeenth CCIR Plenary Assembly (1990).

71. ECA will co-ordinate the yearly publication of an African bulletin on remote sensing applications in co-operation with ECA-sponsored regional centres. The bulletin will be additional to the individual newsletters which the regional centres will be publishing periodically.

Special projects or ad hoc activities

72. The UNESCO Intergovernmental Oceanographic Commission (IOC)/WMO Joint Working Committee for the Integrated Global Ocean Services System (IGOSS) is at present studying the operational exchange of remotely sensed oceanographic data as a part of the IGOSS data processing and services system. Archiving and the exchange of non-operational remotely sensed oceanographic data are being studied by the IOC Technical Committee on International Oceanographic Data and Information Exchange (IODE) (see A/AC.105/389, para. 41). Revision of the marine environmental data information (MEDI) referral system operated by IOC (see A/AC.105/373, para. 37) is currently being studied. Within the framework of the IOC global investigation of pollution in the marine environment (GIPME), the possibility of using remotely sensed data to monitor marine pollution is being studied through groups of experts and case studies. Studies will be carried out on applications of remote sensing in coastal zone and shelf seas dynamic studies. IOC has initiated consultations on the potential satellite observing systems in the 1990s for oceanography and its future role.

73. FAO will continue regional monitoring of vegetation and precipitation in Africa by ARTEMIS, which became operational in August 1988. The ARTEMIS 10-day and monthly image maps are used for the early identification of high-risk areas for migratory pests, such as desert locusts, as well as areas that may suffer from agricultural drought, land degradation and other natural or man-made disasters. FAO also provides ARTEMIS image products to regional and national food security and desert locust control programmes in the IGADD and SADCC countries.

74. UNEP, through its GEMS and GRID, in conjunction with the International Lake Environment Committee (ILEC), is developing a project to examine the use of GIS for ascertaining the influence of watersheds on lake water quality. It will focus initially on Lake Biwa (Japan) and Lac Leman (Switzerland) making full use, inter alia, of high-resolution satellite data.

B. COMMUNICATIONS

1. Education and training programmes through training courses, workshops, seminars and fellowships

Training courses/workshops/seminars

75. The United Nations Space Applications Programme plans to organize a Workshop on Space Communications for Development: Current and Future Developments, Rural Communication, Search and Rescue Missions and Disaster Relief, for the benefit of Member States in the ECLAC region, to be held at Havana from 26 to 30 March 1990.

76. United Nations/ESCAP/UNESCO Seminar on Applications of Space Technology in the Mitigation of the Effects of Natural Disasters in China, June or September 1991; the United Nations Space Applications Programme is also planning to hold a United Nations International Seminar on Satellite Communications, in 1991.

77. WHO will continue its efforts towards the development and strengthening of communications systems support to primary health care in remote areas. The activities will include increasing training opportunities and the promotion of intersectoral collaboration and technical co-operation among developing countries (see A/AC.105/415, para. 68).

78. FAO, jointly with ESA, will organize a training course for operators of DIANA telecommunication terminals at Fucino, Italy, in 1990.

Fellowships

79. Through the United Nations Programme on Space Applications, Governments and international organizations are providing long-range fellowship support for candidates from developing countries as follows:

(a) The Government of Austria has renewed its offer of two fellowships for study and training in the area of microwave technology for satellite communication. These fellowships are tenable in 1989-1990 at the Technical University of Graz, Austria;

(b) ESA has renewed its offer of a one-year fellowship in the field of communications engineering tenable at the European Space Research and Technology Centre (ESTEC), Noordwijk, Netherlands, in 1990;

(c) In addition, ESA is offering a one-year fellowship in the area of telecommunications tenable at ESA (Directorate of Telecommunications) in Noordwijk, Netherlands, in 1990.

2. Expert services and survey missions to identify specific areas of applications relevant to a given country or group of countries and to carry out specific studies on pilot projects

Provision of expert services

80. ITU activities in the area of satellite communications include the following:

(a) Participation, at the request of telecommunication administrations, in the planning of regional or domestic satellite communications systems as well as Earth station projects and in organizing seminars on space communications;

(b) Provision of expert advice on satellite broadcasting systems in view to assist the Saudi Arabian Ministry of Information, within a technical co-operation project until March 1990;

(c) Provision of specialized experts services to the Romanian Electronics Research Institute in the design of Meteorological ground stations, which will be organized during 1990 and 1991;

(d) Provision of the expertise in planning satellite communications for rural areas to Democratic Yemen in 1990;

(e) Provision of technical assistance to administrations by the International Frequency Registration Board (IFRB), as specified by the provision of the radio regulations with a view to: the selection of appropriate orbital positions for the space stations of their projected networks; the co-ordination of their requirements for frequency assignments to stations in the space communication services; and the establishment of their national frequency management system. In addition, the IFRB specialized secretariat will continue to provide training assistance to officials from administrations and, upon request, send its experts to the various regional, interregional or global seminars and conferences related to space communications.

81. ECA will continue in 1990-1991 to provide, upon request, technical assistance to telecommunications organizations of member States by: (a) planning expansion services to the rural communities and the modernization of facilities of their national telecommunications networks; and (b) providing expert assistance for human resources development and management for telecommunications facilities and services.

Study and pilot projects

82. The United Nations Space Applications Programme is collaborating with the Government of China in developing a satellite communications and television education programme for China.

83. The feasibility study of the Regional African Satellite Communication System for the Development of Africa (RASCOM), with ITU as lead agency co-ordinator, is expected to be completed by the third trimester of 1990, at which time the draft report will be circulated to all countries, and subsequently a meeting of the Interim Executive Committee (IEC) will be convened by the Inter-Agency

Co-ordinating Committee (IACC) to assess thoroughly the findings of the project and make the necessary recommendation for the follow-up phase to the appropriate Conference of Ministers for final decision.

(a) Besides the studies at the national level, these activities also comprise the regional-level study of the RASCOM project which is now under way. This study includes terrestrial and satellite aspects, for which inputs from the country study reports are being used;

(b) The members of IEC (African countries participating in the project) will orient the project activities, study the various reports, especially from the financial, technical and economic points of view, and submit recommendations to the Conference of Ministers. IACC, chaired by the Organization of African Unity (OAU), also submits reports and recommendations to the Conference of Ministers via IEC.

84. UNESCO activities include the following:

(a) UNESCO, as a member of IACC, is participating actively in the feasibility study of RASCOM;

(b) In the context of the World Decade for Cultural Development, for which UNESCO is the lead agency, a feasibility study will also be undertaken for the establishment of a world-wide satellite network for educational purposes;

(c) UNESCO continues to support the development of the Arab Satellite Communication Organisation (ARABSAT), pursuant to the resolutions of the Inter-Agency Conference on Communication Policies in the Arab States (ARABCOM), especially through its collaboration with the Arab States Broadcasting Union (ASBU). UNESCO sponsors regional intergovernmental meetings to increase utilization of ARABSAT;

(d) With respect to the decisions and recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, August 1982 (UNISPACE 82), UNESCO and the International Programme for the Development of Communications (IPDC) will continue to make every effort, within the scope of their mandate and subject to the availability of financial resources, to assist all member States, in particular the developing countries, to promote the use of space technology for economic, social and cultural development;

(e) The promotion of the Convention relating to the distribution of programme carrying signals transmitted by satellite (1976 Brussels Convention) will continue. Also, UNESCO, in collaboration with WIPO and ILO, will continue to study the different aspects of the problems that other conventions raised, e.g., the Rome Conventions on the law and its practice concerning cable and satellite transmission as well as the principles on the protection of performers, producers and phonograms and broadcasting organizations, particularly concerning cable and satellite transmission.

85. During the period 1990-91, FAO will continue its co-operation with ESA in the development and testing of a DIANA satellite communication system for real-time transmission of ARTEMIS image maps and other remote-sensing products to users in Africa. The DIANA user's network will initially consist of between three and five terminals (Algiers, Harare, Nairobi, Niamey), linked to FAO headquarters for the transfer of ARTEMIS data products, facsimile documents and operations communications (see para. 45). Also, UNEP has recently decided to participate in the DIANA system and WMO is considering its participation.

86. WHO continues to support the development of satellite networks to improve health conditions. WHO particularly will follow the development of low-cost, powerful telecommunications ground stations to ascertain their cost-effectiveness in enhanced communications support for improved health services in rural areas. Also, WHO is following the feasibility study of RASCOM for its contribution to improved communications to and between those geographic areas that have either poor or non-existent communication facilities, needed, inter alia, as support to health services.

87. ECA will continue the establishment of a rural telecommunications pilot project in 1990-1991 aimed at demonstrating the flexibility, effectiveness and economy of telecommunications for supporting basic communications to rural communities.

88. ECA, as a member of IACC, is participating in the feasibility study for RASCOM. With the approval of appropriate bodies, including the ECA Conference of Ministers, preparatory activities for launching a regional satellite will commence.

3. Dissemination of information on the status of technology

89. ITU permanent organs will continue to contribute in this sphere with the following activities:

(a) Studies on technology and spectrum utilization for space communications which will be continued in the study period 1990-1994, in the light of technological developments by the CCIR Study Groups 1, 2, 4, 5, 7, 8, 10, and 11;

(b) The CCIR handbook on satellite-based services of time and frequency dissemination, presently in progress, is expected to be finished by the end of 1990;

(c) The International Telegraph and Telephone Consultative Committee (CCITT) is actively continuing to work on a study programme concerning space technology (see A/AC.105/389, para. 56 (c));

(d) The CCIR Joint Interim Working Party (JIWP CMTT-4-10-11/1), established to deal with the use of satellite transmission for news gathering (SNG), prepared a recommendation that gives guidelines for the international use of SNG and a supporting report, both of which the seventeenth CCIR Plenary Assembly will consider for adoption in 1990;

(e) Organization of biennial seminars on frequency management and the use of radio frequency spectrum and the geostationary satellite orbit by the International Frequency Registration Board (IFRB), with a view to providing direct technical assistance to the participating countries;

(f) Publication in the ITU Telecommunication Journal of a list of satellites launched, together with their summary descriptions. Recapitulatory tables will also be published annually;

(g) Publication of ITU's "Report on telecommunication and the peaceful uses of outer space";

(h) TELECOM 91, the sixth in a series of quadrennial World Telecommunication Exhibitions, will take place at Geneva from 8 to 15 October 1991, highlighting the general theme "An interconnected world: improving the quality of life for all". It will inform the 166 member countries on the latest advances in telecommunication techniques for the benefit of the members of the Union, in particular the developing countries. It will display exhibits on uses of telecommunication systems, products and services. The prestigious World Telecommunication Forum will be held, consisting of separate symposia on policy, technical and legal, possibly on two other sectors of finance and economy, a World Book Fair on Telecommunications and Electronics, the Golden Antenna Film Festival and the traditional international context of "Youth in the electronic age".

90. IFRB publishes quarterly an updated list of the orbital positions assigned to space stations on board geostationary satellites, together with frequency bands used by those stations (as communicated to IFRB in the framework of articles 11 and 13 of the Radio Regulations). Also, IFRB updates and publishes lists (List VIIIA) providing comprehensive information on satellite systems, including particulars on Earth stations, space stations and radio astronomy stations.

91. WHO will continue its efforts to develop and strengthen communications systems support to primary health care gained by promoting the exchange of information and experiences, by recommending effective communication policies.

92. ECA will continue to provide technical inputs to the publication RASCOM Bulletin, which provides progress reports on the RASCOM feasibility study for the various national co-ordination committees.

4. Regulation of the use of the geostationary satellite orbit and the radio frequency spectrum allocated to space communication services

93. The Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space will continue in 1990, subject to decision by the General Assembly, to consider matters relating to the definition and delimitation of outer space, including consideration of ways and means to ensure the rational and equitable use of the geostationary orbit and the character and utilization of the geostationary orbit, without prejudice to the role of ITU.

94. The outcome of the WARC-ORB-88 Conference, held in 1988 at Geneva, requires additional studies and post-conference activities in several areas that the permanent organs of ITU will carry out in 1990 and subsequent years, related to: (a) updating of technical parameters applicable to the fixed-satellite services; (b) sound broadcasting satellite service in the frequency range 500 MHz to 3000 MHz; (c) appropriate system specifications for the satellite broadcasting of high-definition television (HDTV); and (d) implementation of the frequency allotment plan included in the Final Acts of WARC-ORB-88 for the fixed-satellite service in the 6/4 and 13/10 GHz frequency bands.

95. CCIR Study Group 4 will update technical parameters applicable to the fixed-satellite service. CCIR Study Group 11 established an active work programme for the 1990-1994 study period to prepare the technical information (including interference and frequency-sharing criteria) required to identify a suitable world-wide frequency band for HDTV. CCIR Study Groups 10 and 11 have set up a detailed work programme for the 1990-1994 study period to develop appropriate system specifications and to examine interference conditions as well as to establish sharing criteria for satellite sound broadcasting service in the frequency range 500-3000 MHz.

96. ITU will hold a World Administrative Radio Conference in Spain in 1992 on limited-frequency reallocation in certain frequency bands, particularly those involving mobile satellite and broadcasting satellite services and for studies concerning all mobile satellite services (see para. 138).

97. The ICAO Special Committee on Future Air Navigation System (FANS) has submitted its results to the ICAO Council, retaining the use of satellites in global communications navigation and surveillance. The Aeronautical Mobile Satellite Service Panel (AMSSP), formed as a result of FANS, will participate in the work of the CCIR Interim Working Party (IWP 8/14) relating to the possible inter-system or intra-system sharing of mobile satellite services.

98. WIPO and UNESCO will continue to study various aspects of copyright law that relate to the transmission of programmes by satellite, in particular in the context of the preparation of model provisions for legislation in the field of copyright. Furthermore, in the draft programme and budget for the 1990-1991 biennium, it is envisaged that a number of copyright questions relating to, inter alia, satellite transmissions, will be dealt with in the context of various norm-setting activities.

C. METEOROLOGY

1. Education and training programmes through training courses, workshops, seminars and fellowships

Training courses/workshops/seminars

99. WMO plans to continue collaborating with the United Nations, FAO, ESA and other organizations in the co-sponsorship of training events during 1990, including the following:

(a) Training Seminar on the Use of Environmental Satellite Data in Meteorological Applications;

(b) Training Course on Tropical Meteorology and Tropical Cyclone Forecasting;

(c) Workshop on Extra-tropical and Tropical Limited Area Modelling;

(d) Workshop on Asian/African Monsoons Emphasizing Training Aspects.

100. The WMO proposals for satellite-related events for 1991 include the following:

(a) Training Seminar on the Integrated World Weather Watch System Management;

(b) Training Seminar on WWW Data Management and Monitoring Aspects;

(c) Training Seminar on New Forecasting Techniques in Aeronautical Meteorology;

(d) Roving Training Seminar on Tropical Cyclone Forecasting;

(e) Workshop on Tropical Cyclone Warnings.

These meetings will be organized in close collaboration with the United Nations and other specialized organizations in the United Nations system such as ICAO and FAO, as well as with ESA.

101. ECA, in collaboration with FAO, UNEP and WMO within the framework of the African Centre of Meteorological Applications for Development (ACMAD) programme activities in Niamey, Niger, plans to hold in 1990-1991 training courses/workshops/seminars in the following areas of the applications of meteorology and agro-meteorology in all sectors of development that depend on weather and climate: (a) weather forecasts and monitoring over the African continent; (b) classification of climate and definition of major weather systems over the tropical, semi-arid and arid lands of Africa; (c) development of methods for the application of meteorological information for the improvement of agricultural production and weather-related human activities as well as the development of new and renewable energy sources that depend on the weather and climate; and (d) applied research in meteorology for the better understanding of the atmosphere and climatic processes that cause weather- and climate-related hazards.

Fellowships

102. Through its regular budget or short-term fellowship resources, WMO financially supports the attendance of some participants at the training events which it sponsors, as described in paragraphs 99 and 100 above.

103. Through the United Nations Space Applications Programme, ESA has renewed its offer of a one-year fellowship in the field of satellite meteorology, tenable at the European Space Operations Centre (ESOC), Darmstadt, Federal Republic of Germany, in 1990.

104. ECA has received financial support from UNDP and is in the process of negotiating for additional support from the World Bank and the Governments of Canada, France and the United Kingdom for the support of short-term fellowships for: (a) training of African scientists and middle-level technicians through workshops, seminars and refresher courses; and (b) African research fellows and senior scientists as visiting scholars to benefit ACMAD in the implementation of its work programme.

105. ITU will offer fellowships in 1990 and 1991 in connection with the design and the operation of meteorological ground stations in co-operation with the Romanian Electronics Research Institute.

2. Expert services and survey missions to identify specific areas of applications relevant to a given country or group of countries and to carry out specific studies on pilot projects

106. Following the recommendations of the United Nations Meeting of Experts on Remote Sensing and Satellite Meteorology Applications to Marine Resources and Coastal Environment held at Maspalomas, Gran Canaria, Spain, in 1989, the Programme is in consultation with UNDP, the specialized agencies and Member States in the Atlantic coast of Africa region regarding the establishment of a regional programme/project on the use of space technology in various oceanographic/coastal environment fields.

107. Following the recommendations of the United Nations IOMAC meeting at Karachi, Pakistan, in July 1989, arrangements are being made for a pilot project with the NOAA/National Environmental Satellite Data and Information Service (NESDIS) hosting two teams of four to five remote sensing scientists from the IOMAC member States to work together for about six months. Consultations are also being made with UNDP to support an IOMAC programme for an integrated marine space applications project (MSAP) and a regional information service. As part of the IOMAC programme, there will be three remote sensing projects carried out in Indonesia, Sri Lanka and Tanzania respectively.

108. The application of satellite technology in meteorology and operational hydrology forms an important element of the technical co-operation activities of WMO. These activities are undertaken generally with assistance from the voluntary co-operation programme (VCP) of either WMO or UNDP. The following activities are planned for 1990-1991 and future years.

(a) Africa. A number of countries, including the Federal Republic of Germany, France, the United Kingdom and the United States, are donating data collection platforms (DCPs) for the collection of meteorological data via the geostationary meteorological satellite METEOSAT to 15 countries in Africa, to

upgrade meteorological observations. These are being installed in Ethiopia, Kenya, the Sudan and other countries as part of an operational World Weather Watch system evaluation for Africa. The project also includes the installation of DCP retransmission stations (DRS) in various national meteorological centres and the meteorological data dissemination (MDD) function of the METEOSAT operational programme. An AVHRR receiving station (NOAA and METEOSAT) has been installed at the AGRHYMET Centre, Niger, within the framework of the French/United States contribution to the AGRHYMET Programme Phase III (1987-1991) which permits the Centre to receive daily data from NOAA satellites in real-time and meteorological information from METEOSAT. A pilot project consisting of the installation of DCPs using the METEOSAT system is being implemented in Morocco for flood forecasting purposes. A multi-donor project is now under preparation to monitor the weather conditions affecting development, growth and movements of desert locusts in Africa. Under this project 50 automatic stations will be installed.

(b) Asia. UNDP is providing valuable assistance to tropical cyclone affected countries through the ESCAP/WMO Typhoon Committee, the WMO/ESCAP Panel on Tropical Cyclones for the Bay of Bengal and the Arabian Sea, the Tropical Cyclone Committee for the South Pacific and the Hurricane Committee regions for the period 1987 to 1990. This support includes assistance for installation of advanced meteorological satellite ground facilities and training events in the application of satellite data to tropical cyclone and flood forecasting and early warning services. Also, snow measurement equipment using the polar-orbiting satellite system (Argos) is being installed in Pakistan.

(c) Americas. As part of a FINNIDA project it is planned to use satellite communications for the CEMET circuits in Central America. A flood main mapping system is being installed in Jamaica using remote sensing techniques. In the Dominican Republic, 20 DCPs are being installed in the Yaqué de Norte basin for hydrological purposes using the geostationary operational environmental satellite (GOES) satellite. In Brazil, a project for the use of remote sensing for monitoring environmental changes in the Amazon is being considered by UNDP. WMO will be invited to participate.

109. ECA will continue in 1990-1991 to collaborate with all concerned United Nations and intergovernmental organizations, and particularly UNEP, the United Nations Sudano-Sahelian Office (UNSO), UNESCO, WMO, COMIDES and IGADD working in the region to combat the impacts of drought and desertification and to implement pilot projects.

110. ECA will collaborate with FAO, WMO and the United Nations Programme on Space Applications, for the benefit of ACMAD, in any arrangements for the use of meteorological and Earth resources satellite data to evaluate and manage marine resources and the coastal environment in Africa.

3. Dissemination of information on the status of technology

111. The Long-term Plan for the World Weather Watch of WMO, which extends to 1997, emphasizes satellite technology for obtaining meteorological data through remote sensing techniques. Satellite-based data collection and dissemination systems are being increasingly used in the Global Telecommunication System (GTS) of WWW. The application of satellite technology is particularly important in activities carried out under the Tropical Cyclone Programme (TCP) to mitigate disasters caused by tropical cyclones. TCP aims at improving the capability of national meteorological and hydrological services to provide forecasts and timely warnings of violent winds, torrential rainfall, floods, storm surges and landslides/landslips caused by tropical cyclones. These activities are based on the WWW and operational hydrology programmes of WMO, which take into account the remote sensing and data transmission capabilities of satellites.

112. Through the Argos Data Collection and Location System (flown on the NOAA satellites) efforts will continue to encourage the release of all buoy data, in particular those processed by the collect localization satellite (CLS) for distribution through GTS of WMO for the general benefit of national meteorological services and of oceanographic institutions. To assist in these efforts and to endeavour to co-ordinate the use of drifting buoys, WMO and IOC have jointly established a Drifting-Buoy Co-operation Panel with the participation of interested member States (see A/AC.105/389, para. 81, and A/AC.105/415, para. 107).

113. Considerable efforts continue to be undertaken within WMO to provide information on developments in INMARSAT and to promote its application among WMO members, as well as to assist its members in adapting their marine observations and services systems to meet the requirements of the new telecommunications arrangements.

114. The use of data collection capabilities on geosynchronous meteorological satellites is growing rapidly. Particularly important is the use of the International Data Collection System (IDCS), where the main emphasis is on obtaining data from above ocean areas. Two systems, carried on board a ship and aircraft to collect high-quality aerological data through meteorological satellites, have been developed for use in WWW. Implementation began in 1988 and will continue for several years.

115. The overall long-term goals of the WMO/ICSU World Climate Research Programme (WCRP) are to determine to what extent climate can be predicted and the extent of man's influence on climate (see A/AC.105/389, para. 84, and A/AC.105/415, para. 110).

(a) The scientific plan for WCRP gives high priority to understanding the effects of cloudiness on the radiation energy budget (see A/AC.105/373, para. 68, and A/AC.105/415, para. 110 (a)). The International Satellite Cloud Climatology Project (ISCCP), established in July 1983, aimed at the establishment of a five-year global radiance and cloud data set based on observations from the international array of geostationary meteorological satellites and operational polar-orbiting satellites. The project has been extended through June 1995.

(b) Two major observational programmes are involved within WCRP: the study of the inter-annual variability of the tropical ocean and the global atmosphere (TOGA), 1985-1995 (see A/AC.105/342, para. 88 (b), and A/AC.105/415, para. 110 (b)) and the World Ocean Circulation Experiment (WOCE), 1990-1995 (see A/AC.105/309, para. 104, and A/AC.105/415, para. 110 (b)). The decision of France and the United States to proceed with the implementation of the joint Typhoon Operational Experiment (TOPEX)/POSEIDON altimetric mission in 1991 and the preparation of the European oceanographic satellite mission, ERS-1, in 1990 are of particular importance for the success of WOCE.

(c) In addition to ISCCP, WCRP has initiated projects to produce monthly fields of sea surface temperature and precipitation; these projects require substantial amounts of satellite observations.

(d) Finally, WCRP is preparing a "Global energy and water cycle experiment" (GEWEX), planned for 1995-2000, to obtain information on atmospheric thermodynamics, global water transport and land surface processes not available through the existing operational systems (see A/AC.105/415, para. 110 (d)).

116. Within its training publication programme, WMO updates publication No. 240, Compendium of Training Facilities for Meteorological and Operational Hydrology, which, inter alia, contains descriptions of training courses offered by a number of countries on the subjects of satellite meteorology and its applications. The publication will be distributed to all WMO member countries.

117. UNEP, through GEMS, and WMO continue to co-operate within the framework of the World Climate Programme. Climate system monitoring (CSM) focuses on observation of meteorological data, monitoring of the global climate system and analysis of anomalous weather situations. Some of the data analysed come from satellite reports via the Global Telecommunications System (GTS) of WMO. UNEP, UNESCO and the Swiss Federal Institute of Technology continue to co-operate in a World Glacier Monitoring Service (WGMS), encompassing work on the World Glacier Inventory, the results of which will be published in 1990. Other monitoring activities within the programme that involve satellite data include sea ice, snow cover, solar radiation, albedo and clouds (see A/AC.105/415, para. 111). The next output of WGMS will be the first Glacier Mess Balance Bulletin. A modern, fully computer-based service with a programme including satellite observations in remote regions for advanced analysis of glacier and climatic data will be developed in the coming years. The data-base will be compatible and held by GEMS through GRID.

118. Climate monitoring activities within the World Climate Data Programme involve satellite data including sea ice, snow cover, solar radiation, aerosol optical depth, albedo and clouds (see A/AC.105/359, para. 80). The climate data referral system (INFOCLIMA) includes information on some available satellite data sets needed for climate monitoring and research. The World Climate Applications Programme continues to investigate and promote the development of potential uses of satellite data in climate applications. WMO recently established the major climate change detection projects in the framework of which satellite data are intended to be widely used.

119. A new Global Atmosphere Watch (GAW) system has been established to serve as an early warning system to detect changes in the ozone, including greenhouse gases, and pollutants. Ground observations made in the background air pollution monitoring network (BAPMON) will continue to provide information required to verify future satellite-based observations of some atmospheric constituents. The Global Ozone Observing System (GOOS), guided and co-ordinated by WMO, will measure the atmospheric ozone with more than 150 ground-based stations and supplemented in the last decade by a few satellite observing systems.

120. The WMO Commission for Atmospheric Sciences (CAS) continues to rely on the use of satellite data for research, for both climate studies and weather analysis and prediction of all time scales (see A/AC.105/389, para. 86, and A/AC.105/415, para. 113). The CAS working groups, especially those on climate research and weather prediction research, co-ordinate their activities related to satellite data utilization for research with the Executive Council Panel of Experts on Satellites and other bodies concerned. As an implementation action of the WMO Programme on Short- and Medium-range Weather Prediction Research (PSMP) (see A/AC.105/373, para. 72), the application of high-resolution quantitative satellite data will be studied.

121. Based on the structure of WMO's Hydrology and Water Resources Programme, a number of projects relating to hydrological networks and instrumentation, hydrological forecasting methods and systems and the application of remote sensing techniques to operational hydrology are being considered during 1989-1992. A technical report on the application of remote sensing to hydrology is expected to be published in 1990.

122. The WMO Commission for Marine Meteorology (CMM) and the Joint IOC/WMO Working Committee for IGOSS maintain a close interest in the use of satellites for both ocean measurements and communications. A CMM rapporteur is preparing a technical report on the use of satellite data in the provision of marine meteorological services (see A/AC.105/415, para. 115).

123. ECA will continue to encourage member States to strengthen their national collecting stations through the use of GTS and national telecommunications hubs for timely dissemination of meteorological information and data. National weather bulletins will be given wider circulation to reach relevant departments and the rural population.

124. The report on applications of satellite remote sensing techniques in agricultural meteorology to the ninth session of the WMO Commission for Agricultural Meteorology has been published in English and Spanish. It appointed joint rapporteurs on developments in operational remote sensing to prepare appropriate guidance material and to include new developments in the field. The report will be submitted to the tenth session of the Commission in 1990.

125. Recent publications of WMO are as follows: (a) The contribution of satellite data and services to WMO programmes in the next decade, by A. Karpov and D. Miller: WMO-No. 679 (Technical Note No. 189); (b) Survey of meteorological satellite ground-based receiving equipment - WMO Satellite Report SAT-6;

(c) Application of satellite technology/annual progress report 1987 - WMO Satellite Report SAT-7; and (d) Information on meteorological satellite programmes operated by members and organizations (revision of WMO publication No. 411).

126. UNESCO will continue to publish, within the framework of the International Hydrological Programme (IHP), technical reports on new developments concerning the application of remote sensing of water resources.

127. UNEP, through GEMS, together with the WMO World Climate Programme, the Committee on Space Research and the International Association of Meteorology and Atmospheric Physics (IAMAP) will continue active involvement in the International Satellite Land-surface Climatology Project (ISLSCP). ISLSCP has developed and improved algorithms for the evaluation and interpretation of the satellite-borne measurements to obtain climatologically useful information. Many of the key ISLSCP data sets are currently available in geo-referenced form within GRID. Following successful experiments in Denmark (Greenland), France, the Niger and the United States, a number of ISLSCP studies are planned in western China, northern Sudan and Botswana to validate satellite data for different environmental situations and to obtain new information about the applications of satellite data for land-surface studies. Following a successful pilot project, a hydrological atmospheric pilot experiment (HAPEX) study will be carried out in the Niger in the 1990s.

128. UNEP, through its Co-ordinating Committee on the Ozone Layer (CCOL), continues to carry out regular assessments of ozone layer depletion and its impacts. Considerable use is made in such assessments of data from satellite-borne instrument systems (see A/AC.105/373, para. 79).

129. CCIR Study Group 2 of ITU will continue to study questions relating to the meteorological-satellite service and associated technologies. The final meeting of the group (September 1989) summarized the results of studies during the period 1986-1990 and prepared the revisions of the CCIR volume II containing informational texts about that service.

D. BASIC SPACE SCIENCE

130. A United Nations Workshop on Basic Space Research is planned to be held in Trivandium, India, in July 1990 for the benefit of the ESCAP member States.

131. Through the United Nations Programme on Space Applications, the Government of the USSR is offering six nominal fellowships in the following disciplines: S. P. Korolev Fellowship Awards (two) for studies in scientific instrument manufacturing; Ya. B. Zeldovich Fellowship Awards (two) for studies in theoretical and experimental physics; M. V. Keldish Fellowship Award (one) for studies in systems and methods of space information processing; and, K. E. Tsiolkovsky Fellowship Award (one) for research in uses of space technology for Earth rotation and lithosphere plates movement for the benefit of developing countries. These fellowships are being offered at the post-graduate level and will have a duration of three years each. The starting date for the fellowships is 1 December 1989.

132. Through the United Nations Programme on Space Applications, the Government of the German Democratic Republic is offering 2 one-year fellowships, one each in basic space sciences and satellite geodesy, tenable at the Central Institute for Astrophysics and the Central Institute for Physics of the Earth, respectively, Potsdam, German Democratic Republic, in 1989/90.

E. USE OF SPACE TECHNOLOGY FOR LAND, MARITIME AND AERONAUTICAL MOBILE SERVICES

133. Following the 1988 IMO Maritime Safety Conference, the International Convention for the Safety of Life at Sea (SOLAS) amendments should enter into force on 1 February 1992. The Global Maritime Distress and Safety System (GMDSS) will be introduced in stages between 1993 and 1999. Satellite communications form a major part of GMDSS and ships' satellite equipment should be introduced soon. The organization is also continuing the preparation of a master plan of shore-based facilities for GMDSS.

134. The further development of GMDSS to provide its orderly introduction will be continued by IMO in close co-operation with ITU/CCIR, WMO, the International Hydrographic Organization (IHO), INMARSAT and the system for search-and-rescue satellite-aided tracking of the Search and Rescue System (USSR) Space Project (COSPAS-SARSAT).

135. The WHO Regional Office for Europe will test a disaster management work programme. For disaster management, the programme will undertake research and development activities in a few countries to assess the feasibility and efficiency of using the INMARSAT services TT-3020A Standard-C Satellite Transceiver for receiving and communicating information on disasters for prompt and appropriate response.

136. IMO has undertaken studies on a world-wide electronic position-fixing system. Amendments to the 1974 SOLAS Convention will be considered when IMO has been satisfied that a suitable world-wide satellite radio-navigation system meeting its requirements is operational.

137. IMO is also undertaking a study for a world-wide system of transmission and electronic display of nautical information on board ship, including means of updating the electronic navigation chart. Target completion date for the study is 1993.

138. CCIR Study Group 8 (mobile services) established a new interim working party (IWP 8/14) during its interim meeting in 1988 to deal with technical and operating characteristics necessary for compatibility, inter-operability and the required performance levels for systems in the mobile satellite services as well as terrestrial aeronautical public correspondence. The studies involved are of an urgent nature; therefore IWP 8/14 held two meetings before the final meeting of Study Group 8 and prepared many new or modified texts for consideration by the study group and for approval by the seventeenth Plenary Assembly in May 1990.

139. In a special interim council committee of ICAO that addressed the implementation of FANS, two air traffic service providers, the Union of Soviet Socialist Republics and the United States, agreed to implement the Global Orbital Navigation Satellite System (GLONASS) and the Global Positioning System (GPS) in the early 1990s. These systems will apply global satellite navigation networks to international civil aviation, with GLONASS becoming operational not later than 1995 and GPS becoming operational in 1992. Progress of this co-operative work will be co-ordinated with a special ICAO committee.

F. OTHER ACTIVITIES IN THE FIELD OF SPACE SCIENCE AND TECHNOLOGY AND ITS APPLICATIONS

140. The United Nations plans to issue at a future date a United Nations directory on publications and literature with particular emphasis on remote sensing and photogrammetry, in collaboration with the International Society of Photogrammetry and Remote Sensing (ISPRS).

141. Through its Programme on Space Applications, the United Nations will continue to collaborate with the Committee on Space Research by providing support that would enable the participation of scientists from developing countries in the 28th plenary meeting of the Committee to be held in 1990 at The Hague.

142. The Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space will continue in 1990, subject to decision of the General Assembly, to elaborate draft principles relevant to the use of nuclear power sources in outer space and to consider the legal aspects related to the application of the principle that the exploration and utilization of outer space should be carried out for the benefit and in the interest of all States, taking into account the needs of developing countries.

143. The United Nations Centre for Science and Technology for Development, jointly with the Outer Space Affairs Division, is organizing the ATAS VII project on "Space technologies and development". In line with the "alert" philosophy of the Advance Technology Alert System (ATAS) programme, the ATAS VII project aims at enhancing the capabilities of developing countries to assess the impacts of the evolution of space science and technology in the coming decades and to design responsive policies to manage such impacts. The following meetings are envisaged as part of the project: the Euro-Soviet meeting (Moscow, April 1990) on the future of space technologies and applications for development; the North American meeting (California, November 1990) on space technology spin-offs and research: co-operative roles for developing countries; and a meeting in 1991 on the assessment of the evolution of space technologies to the year 2020 and beyond. Selected reference documents presented at the meetings and the outcomes of the discussions will be reflected in the United Nations publication ATAS Bulletin VII on space technologies and development.

144. The United Nations and its specialized agencies will collaborate on preparations for the International Space Year activities. The proposals will be reviewed at the 1990 inter-agency meeting.

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COMMITTEE ON THE PEACEFUL USES
OF OUTER SPACE

CO-ORDINATION OF OUTER SPACE ACTIVITIES WITHIN THE UNITED NATIONS SYSTEM; PROGRAMMES OF WORK FOR 1990 AND 1991 AND FUTURE YEARS

Report of the Secretary-General

Corrigendum

Page 5, line 5

For Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space read Office of Legal Affairs (OLA)

Page 7, Matrix of outer space programmes

In column B.4, the item for "OLA" should read 93

Page 10, paragraph 12

For the existing text substitute

12. The Legal Sub-Committee of the United Nations Committee on the Peaceful Uses of Outer Space will continue to elaborate draft principles related to nuclear power sources in outer space, to consider matters relating to the definition of outer space and to the geostationary orbit and to consider legal aspects of the sharing of the benefits of the exploration and utilization of outer space, taking into account the needs of developing countries.

Page 29, paragraph 93

For the existing text substitute

93. The Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space will continue in 1990, subject to decision by the General Assembly, to consider matters relating to the definition and delimitation of outer space and to the

character and utilization of the geostationary orbit, including consideration of ways and means to ensure the rational and equitable use of the geostationary orbit without prejudice to the role of ITU.

Page 39, paragraph 142, line 6

For interest read interests